

### Abstract of the Disclosure

Disclosed is a liquid crystal display (LCD) controller with improved dithering and frame rate control to reduce the physical (hardware) cost and power consumption, and a method thereof. The LCD controller utilizes a mechanism of minimizing a size of a dithering pattern register which stores plural gray levels. A duty cycle value for the respective gray levels is determined by using the same bit number as denominator values of the plural gray levels. The LCD controller includes a dithering pattern register section for storing the plural gray levels, modular register counters for performing counting operation to determine a binary value of most significant bit of the respective gray levels, multiplexers for generating data patterns for the respective gray levels in accordance with an output of the respective modular register counters; and a selection means for selecting and generating a corresponding bit of a data pattern corresponding to pixel data provided on a LCD panel.